

# LUXEON XR-5050 HE

High performance LED modules with extreme efficacy for robust lighting designs

LUXEON XR-5050 HE integrated modules are standard products compatible with off-the-shelf drivers, optics, and heat sinks. These versatile building blocks feature 8, 12, 16 or 24 LUXEON 5050 HE LEDs on a MCPCB substrate for thermal efficiency and mechanical robustness. This approach simplifies system integration and accelerates time-to-market.



## FEATURES AND BENEFITS

- Efficacy and Luminous flux of up to 191lm/W typ and 8636lm available
- CCT/CRI Options: 2200K, 2700K, 3000K, 3500K, 4000K, 5000K, 5700K (70, 80 and 90 CRI)
- Superior board level color control of  $\leq 3\text{SDCM}$
- MCPCB for efficient heat dissipation and mechanical robustness
- UL 8750, ENEC, ENEC+, CE, UKCA compliance
- 5-year limited guarantee
- Designs compatible with standard third-party optics

## PRIMARY APPLICATIONS

- High Bay
- Low Bay
- Sport Lights
- Outdoor Area Lights
- Roadway Lights

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# General Product Information

## Product Test Conditions

LUXEON XR-5050 HE 8up, 12up and 16up modules are tested using a 20ms monopulse (MP) at 700mA and a case temperature,  $T_c$  of 85°C.

LUXEON XR-5050 HE 24up modules are tested using a 20ms monopulse (MP) at 1050mA, case temperature  $T_c$  of 85°C.

## Part Number Nomenclature

Part numbers for LUXEON XR-5050 HE follow the convention below:

L 2 2 5 – **A A B B 0 C C M D D 0 1 0**

Where:

- A A** – designates nominal ANSI CCT (22=2200K, 27=2700K, 30=3000K, 35=3500K, 40=4000K, 50=5000K, 57=5700K)
- B B** – designates minimum CRI (70=70CRI, 80=80CRI and 90=90CRI)
- C C** – designates number of emitters (08=8 emitters, 12=12 emitters, 16=16 emitters, 24=24 emitters)
- D D** – designates internal Lumileds program code
- 1 0** – designates internal Lumileds program code

Therefore, a LUXEON XR-5050 HE 3000K 70CRI with 16 emitters, will have the following part number:

L 2 2 5 – **3 0 7 0 0 1 6 M L U 0 1 0**

## Lumen Maintenance

Please contact your local Sales Representative or Lumileds Technical Solutions Manager for more information about the long-term performance of this product.

## Environmental Compliance

Lumileds Netherlands B.V. is committed to providing environmentally friendly products to the solid-state lighting market. LUXEON XR-5050 HE is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the ROHS Directive 2011/65/EU including amendments 2015/863/EU & 2017/2102/EU and REACH Regulation (EC) 1907/2006. Lumileds LLC will not intentionally add the following restricted materials to its products: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

# Performance Characteristics

## Product Selection Guide

Table 1a. Product performance of LUXEON XR-5050 HE 8up, 12up and 16up at 700mA, T<sub>c</sub>=85°C

NOMINAL CCT	MINIMUM CRI <sup>[1, 2]</sup>	LUMINOUS FLUX <sup>[1]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	ENERGY EFFICIENCY CLASS <sup>[3]</sup>	PART NUMBER
		MINIMUM	TYPICAL			
2200K	70	2438	2523	161	D	L225-2270008MLU010
2700K	70	2698	2801	179	D	L225-2770008MLU010
3000K	70	2801	2880	184	C	L225-3070008MLU010
3500K	70	2831	2911	186	C	L225-3570008MLU010
4000K	70	2882	2985	191	C	L225-4070008MLU010
5000K	70	2882	2981	191	C	L225-5070008MLU010
5700K	70	2865	2919	187	C	L225-5770008MLU010
2700K	80	2344	2492	159	E	L225-2780008MLU010
3000K	80	2448	2605	167	D	L225-3080008MLU010
3500K	80	2556	2713	173	D	L225-3580008MLU010
4000K	80	2661	2763	177	D	L225-4080008MLU010
2200K	70	3657	3785	161	D	L225-2270012MLU010
2700K	70	4046	4202	179	D	L225-2770012MLU010
3000K	70	4202	4320	184	C	L225-3070012MLU010
3500K	70	4246	4366	186	C	L225-3570012MLU010
4000K	70	4323	4478	191	C	L225-4070012MLU010
5000K	70	4323	4471	191	C	L225-5070012MLU010
5700K	70	4298	4378	187	C	L225-5770012MLU010
2700K	80	3516	3738	159	E	L225-2780012MLU010
3000K	80	3673	3907	167	D	L225-3080012MLU010
3500K	80	3835	4069	173	D	L225-3580012MLU010
4000K	80	3991	4144	177	D	L225-4080012MLU010
2200K	70	4876	5047	161	D	L225-2270016MLU010
2700K	70	5395	5603	179	D	L225-2770016MLU010
3000K	70	5603	5760	184	C	L225-3070016MLU010
3500K	70	5661	5822	186	C	L225-3570016MLU010
4000K	70	5764	5970	191	C	L225-4070016MLU010
5000K	70	5764	5962	191	C	L225-5070016MLU010
5700K	70	5731	5837	187	C	L225-5770016MLU010
2700K	80	4688	4984	159	E	L225-2780016MLU010
3000K	80	4897	5209	167	D	L225-3080016MLU010
3500K	80	5113	5426	173	D	L225-3580016MLU010
4000K	80	5321	5526	177	D	L225-4080016MLU010

**Notes for Table 1a:**

1. Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Energy efficiency class as specified in Commission Delegated Regulation (EU) 2019/2015. The available range of energy efficiency classes is A-G.

Table 1b. Product performance of LUXEON XR-5050 HE 24up at 1050mA, T<sub>c</sub>=85°C

NOMINAL CCT	MINIMUM CRI <sup>[1, 2]</sup>	LUMINOUS FLUX <sup>[1]</sup> (lm)		TYPICAL LUMINOUS EFFICACY (lm/W)	ENERGY EFFICIENCY CLASS <sup>[3]</sup>	PART NUMBER
		MINIMUM	TYPICAL			
2200K	70	6856	7272	155	E	L225-2270024MLU010
2700K	70	7618	8042	171	D	L225-2770024MLU010
3000K	70	7923	8328	177	D	L225-3070024MLU010
4000K	70	8317	8636	184	C	L225-4070024MLU010
5000K	70	8317	8636	184	C	L225-5070024MLU010
5700K	70	8121	8442	179	D	L225-5770024MLU010
2700K	80	6733	7241	154	E	L225-2780024MLU010
3000K	80	7039	7553	161	D	L225-3080024MLU010
4000K	80	7661	8025	171	D	L225-4080024MLU010
5000K	80	7661	8025	171	D	L225-5080024MLU010
5700K	80	7578	7914	168	D	L225-5780024MLU010
5700K	90	6396	6834	145	E	L225-5790024MLU010

Notes for Table 1b:

1. Lumileds maintains a tolerance of ±2 on CRI and ±7% on luminous flux measurements.
2. Typical CRI is approximately 2 points higher than the minimum CRI specified, but this is not guaranteed.
3. Energy efficiency class as specified in Commission Delegated Regulation (EU) 2019/2015. The available range of energy efficiency classes is A-G.

## Electrical and Thermal Characteristics

Table 2a. Electrical characteristics for LUXEON XR-5050 HE 8up, 12up and 16up at 700mA, T<sub>c</sub>=85°C

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> (V <sub>f</sub> )		
	MINIMUM	TYPICAL	MAXIMUM
L225-xxxx008MLU010	20.6	22.4	23.0
L225-xxxx012MLU010	30.9	33.6	34.5
L225-xxxx016MLU010	41.1	44.7	45.9

Notes for Table 2a:

1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

Table 2b. Electrical characteristics for LUXEON XR-5050 HE 24up at 1050mA, T<sub>c</sub>=85°C

PART NUMBER	FORWARD VOLTAGE <sup>[1]</sup> (V <sub>f</sub> )		
	MINIMUM	TYPICAL	MAXIMUM
L225-xxxx024MLU010	42.0	44.8	45.2

Notes for Table 2b:

1. Lumileds maintains a tolerance of ±0.1V on forward voltage measurements.

## Board Level Color Control

Table 3. Board Level Color Control for LUXEON XR-5050 HE

PART NUMBER	COLOR CONTROL
L225-xxxx008MLU010	3SDCM
L225-xxxx012MLU010	
L225-xxxx016MLU010	
L225-xxxx024MLU010	

## Absolute Maximum Ratings

Table 4a. Absolute maximum ratings for LUXEON XR-5050 HE 8up, 12up and 16up

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1, 2]</sup>	1600mA
Peak Pulsed Forward Current <sup>[1, 3]</sup>	2000mA
Maximum Working Voltage <sup>[4]</sup>	60Vdc
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 3B
Operating Case Temperature at T <sub>c</sub> point <sup>[1]</sup>	-40 to 85°C
Storage Temperature	-40°C to 105°C
Reverse Voltage (V <sub>reverse</sub> )	LUXEON LEDs are not designed to be driven in reverse bias

**Notes for Table 4a:**

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable T<sub>c</sub> temperature.
- Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
  - The frequency of the ripple current is 100Hz or higher
  - The average current for each cycle does not exceed the maximum allowable DC forward current
  - The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current
- At 50% duty cycle with pulse width of 5ms.
- Basic insulation between live parts on the LED module and mounting surface or touchable parts when mounted in a luminaire for SELV and other than SELV operations according to IEC 62031.
- T<sub>c</sub> = T<sub>p</sub> (Test Point).

Table 4b. Absolute maximum ratings for LUXEON XR-5050 HE 24up

PARAMETER	MAXIMUM PERFORMANCE
DC Forward Current <sup>[1, 2]</sup>	2000mA
Peak Pulsed Forward Current <sup>[1, 3]</sup>	3000mA
Maximum Working Voltage <sup>[4]</sup>	250Vdc
ESD Sensitivity (ANSI/ESDA/JEDEC JS-001-2012)	Class 2
Operating Case Temperature at T <sub>c</sub> point <sup>[1]</sup>	-40 to 85°C
Storage Temperature	-40°C to 105°C
Reverse Voltage (V <sub>reverse</sub> )	LUXEON LEDs are not designed to be driven in reverse bias

**Notes for Table 4b**

- Proper current derating must be observed to maintain the junction temperature below the maximum allowable T<sub>c</sub> temperature.
- Residual periodic variations due to power conversion from alternating current (AC) to direct current (DC), also called "ripple," are acceptable if the following conditions are met:
  - The frequency of the ripple current is 100Hz or higher
  - The average current for each cycle does not exceed the maximum allowable DC forward current
  - The maximum amplitude of the ripple does not exceed the maximum peak pulsed forward current
- At 50% duty cycle with pulse width of 5ms.
- Basic insulation between live parts on the LED module and mounting surface or touchable parts when mounted in a luminaire for SELV and other than SELV operations according to IEC 62031.
- T<sub>c</sub> = T<sub>p</sub> (Test Point).

# Application Information

Table 5a. Approbation for LUXEON XR-5050 HE 8up, 12up and 16up

ITEM	COMPLIANT TO
Test and Certification	CE
	UKCA
	ENEC
	ENEC+
	UL8750 (UL file no. E335118)
Declaration	RoHS
	REACH

Table 5b. Approbation for LUXEON XR-5050 HE 24up

ITEM	COMPLIANT TO
Test and Certification	CE
	UKCA
	ENEC
	UL8750 (UL file no. E335118)
Declaration	RoHS
	REACH

## Recommended Wire

Table 6. Recommended Wire for LUXEON XR-5050 HE

RECOMMENDED WIRE	INSULATOR DIAMETER	STRIP LENGTH
AWG 26-18	Maximum 2.5mm	4mm to 5mm

# Characteristic Curves

## Spectral Power Distribution Characteristics

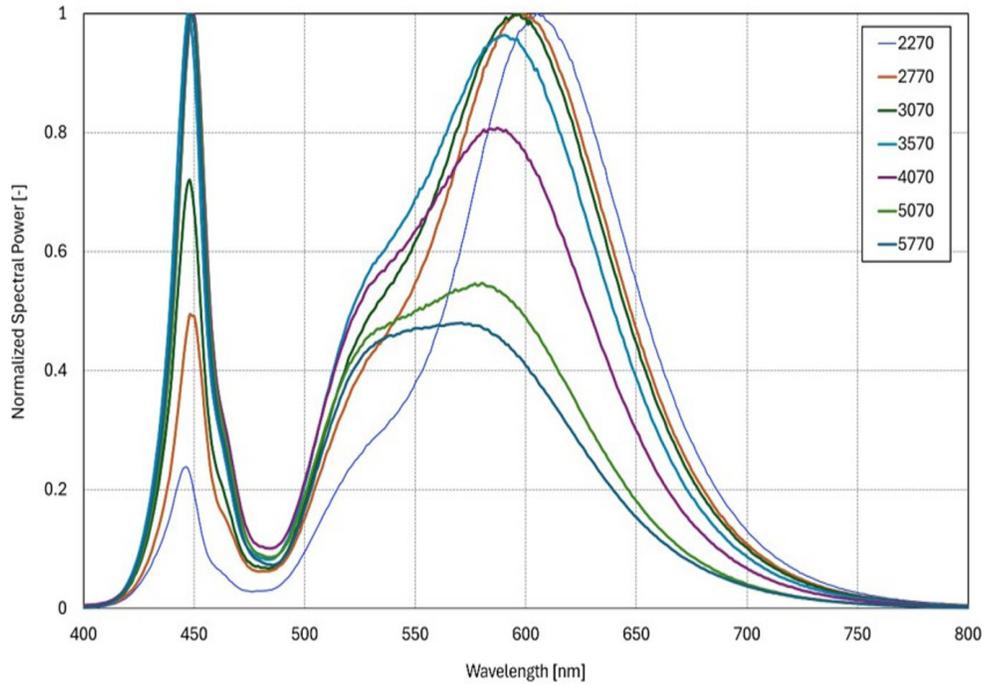


Figure 1a. Typical normalized power vs. wavelength for 70CRI LUXEON XR-5050 HE 8up, 12up and 16up at 1050mA,  $T_c=25^\circ\text{C}$

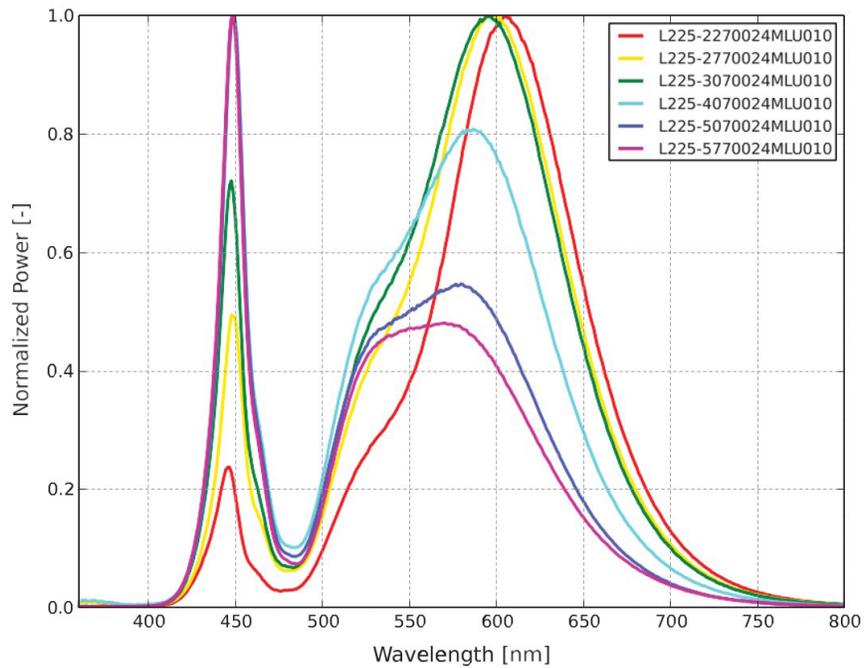


Figure 1b. Typical normalized power vs. wavelength for 70CRI LUXEON XR-5050 HE 24up at 1050mA,  $T_c=25^\circ\text{C}$

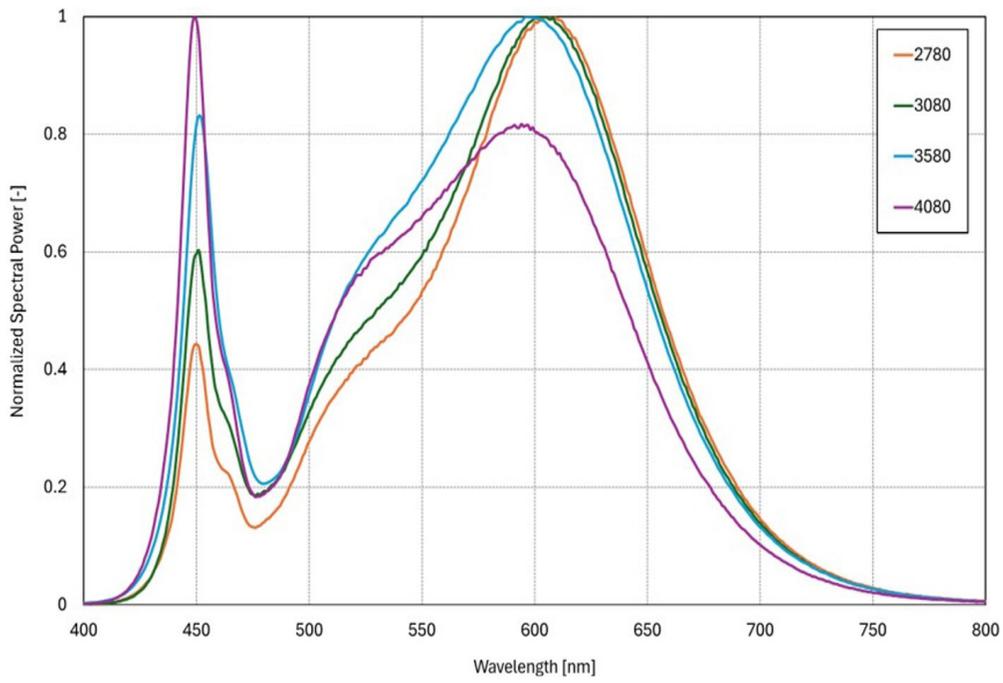


Figure 2a . Typical normalized power vs. wavelength for 80CRI LUXEON XR-5050 HE 8up, 12up and 16up,  $T_c=25^\circ\text{C}$

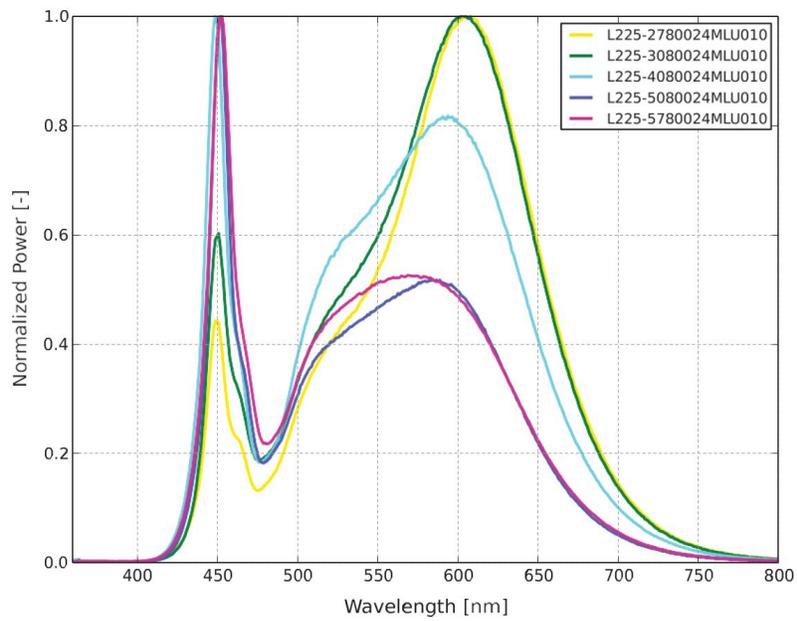


Figure 2b . Typical normalized power vs. wavelength for 80CRI LUXEON XR-5050 HE 24up at 1050mA,  $T_c=25^\circ\text{C}$

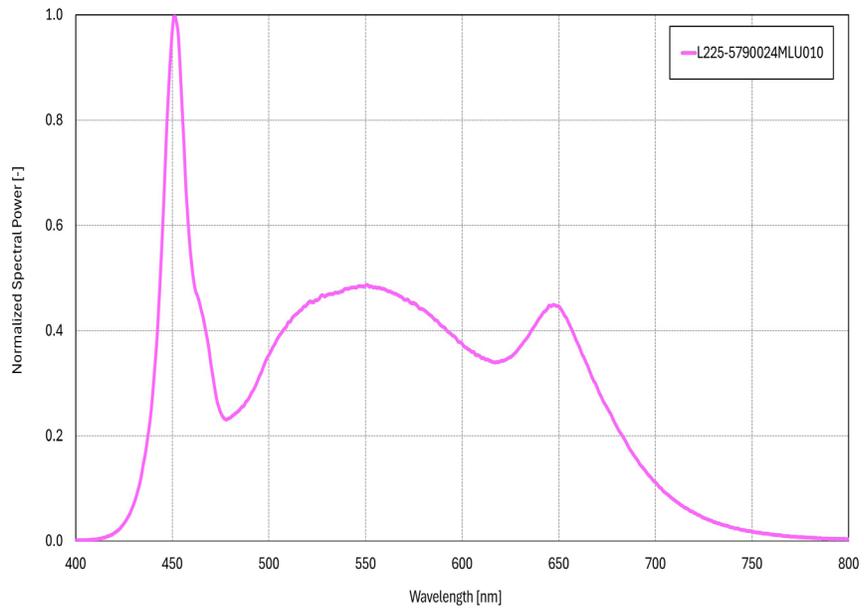


Figure 3. Typical normalized power vs. wavelength for 90CRI LUXEON XR-5050 HE 24up at 1050mA,  $T_c=25^\circ\text{C}$

# Light Output Characteristics

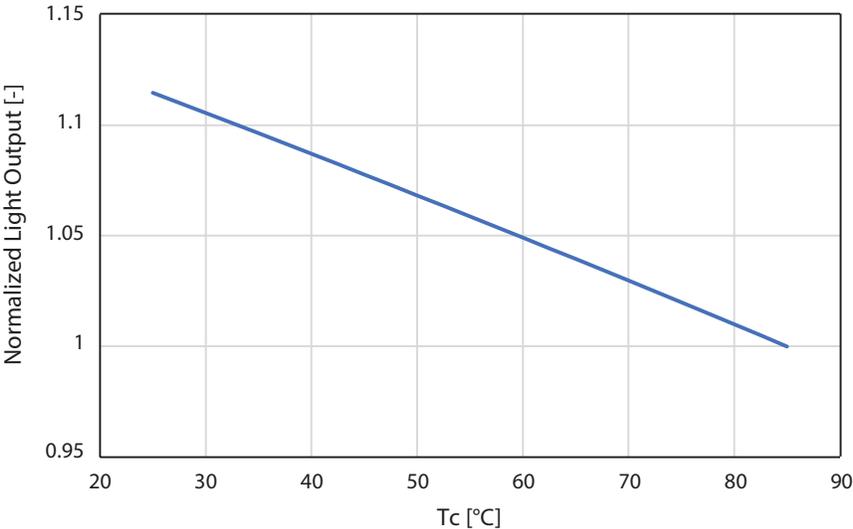


Figure 4a. Typical normalized light output vs. T<sub>c</sub> temperature for LUXEON XR-5050 HE 8up, 12up and 16up at 700mA

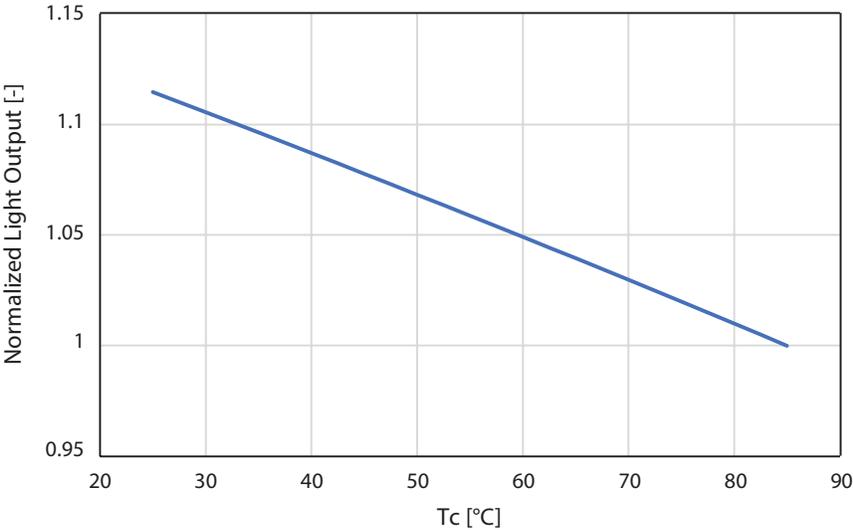


Figure 4b. Typical normalized light output vs. T<sub>c</sub> temperature for LUXEON XR-5050 HE 24up at 1050mA

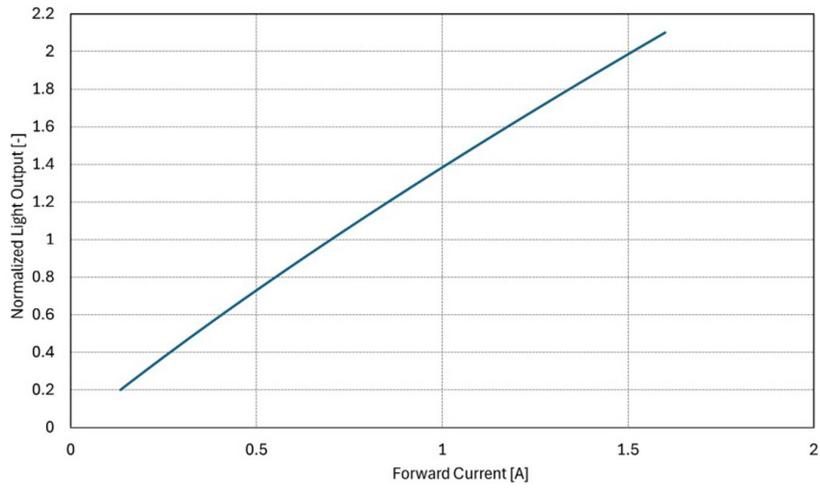


Figure 5a. Typical normalized light output vs. forward current for LUXEON XR-5050 HE 8up, 12up and 16up at  $T_c=85^\circ\text{C}$

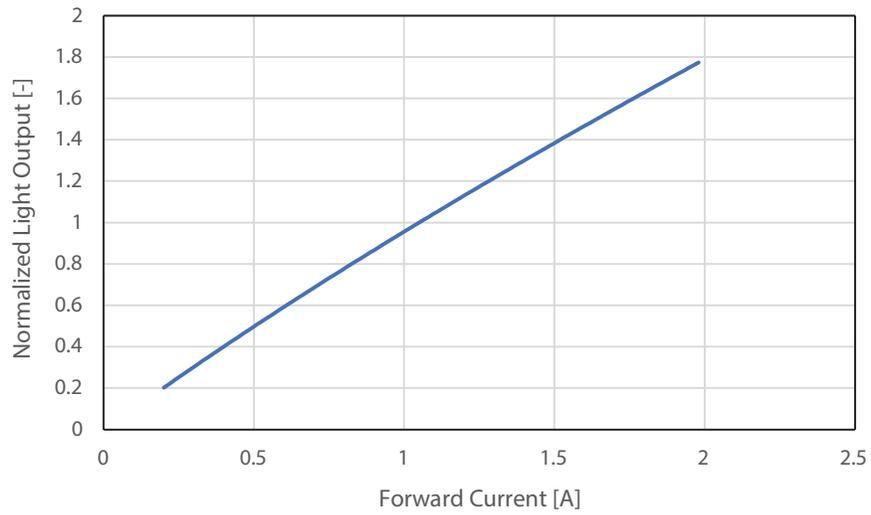


Figure 5b. Typical normalized light output vs. forward current for XR-5050 HE 24up at  $T_c=85^\circ\text{C}$

# Efficacy Characteristics

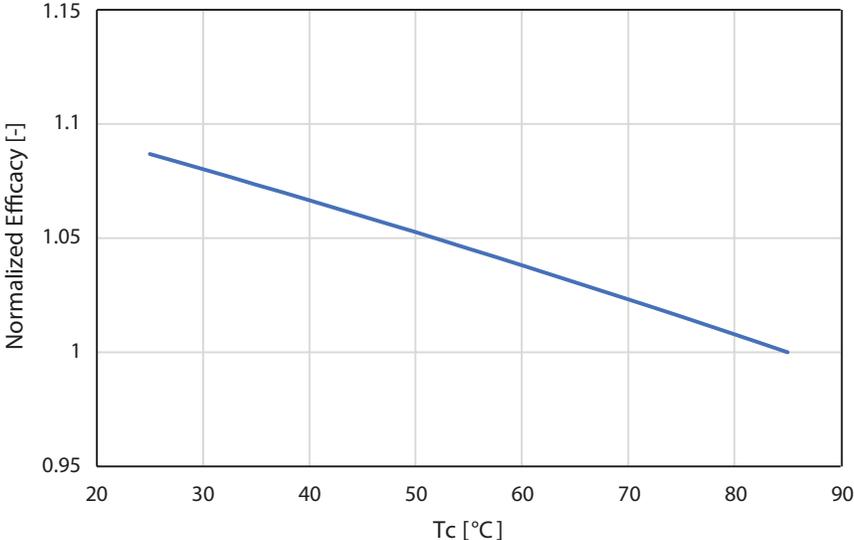


Figure 6a. Typical normalized efficacy vs. T<sub>c</sub> temperature for LUXEON XR-5050 HE 8up, 12up and 16up at 700mA

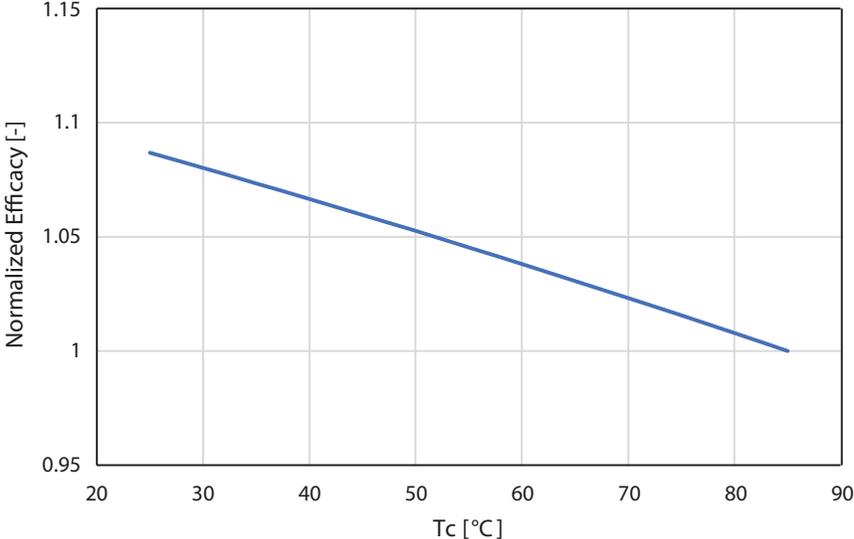


Figure 6b. Typical normalized efficacy vs. T<sub>c</sub> temperature for LUXEON XR-5050 HE 24up at 1050mA

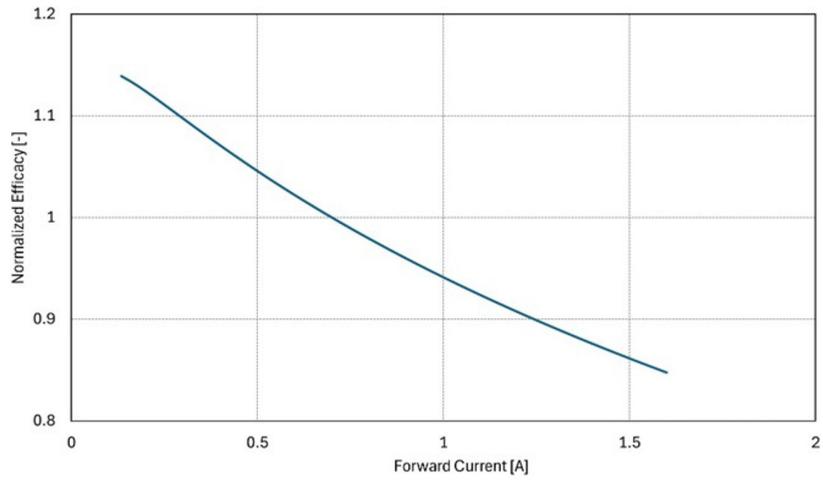


Figure 7a. Typical normalized efficacy vs. forward current for LUXEON XR-5050 HE 8up, 12up and 16up at  $T_c=85^\circ\text{C}$

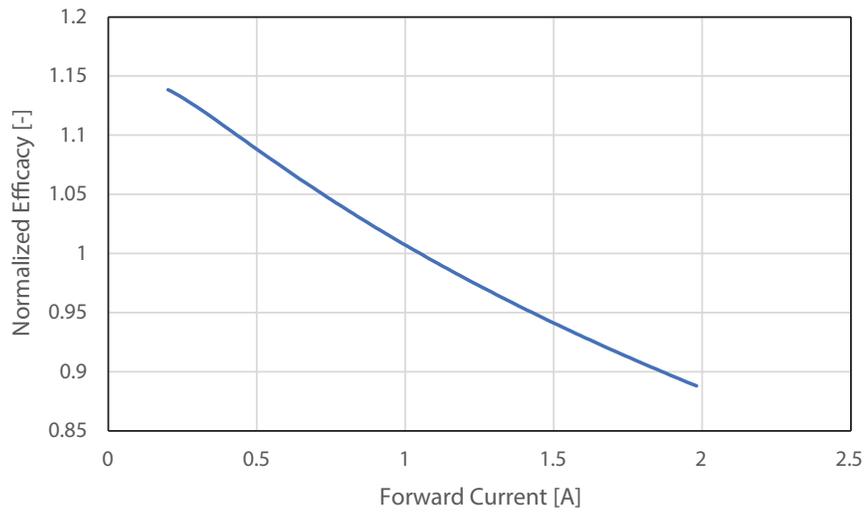


Figure 7b. Typical normalized efficacy vs. forward current for LUXEON XR-5050 HE 24up at  $T_c=85^\circ\text{C}$

# Mechanical Dimensions

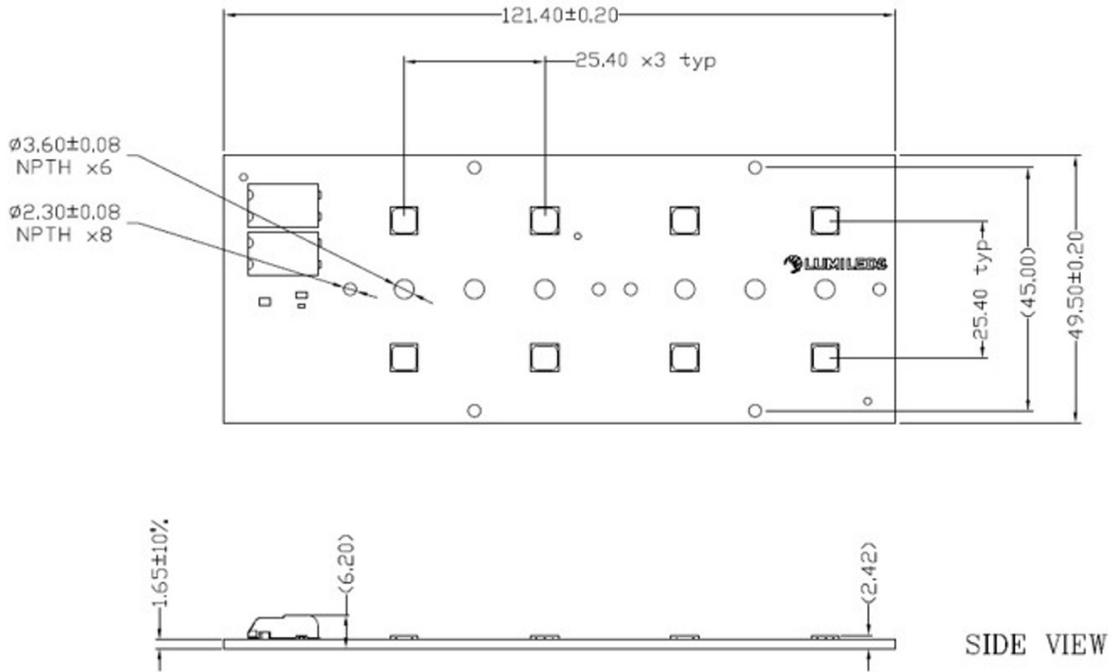


Figure 8. Mechanical dimensions for L225-xxxx008MLU010

- Notes for Figure 8:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

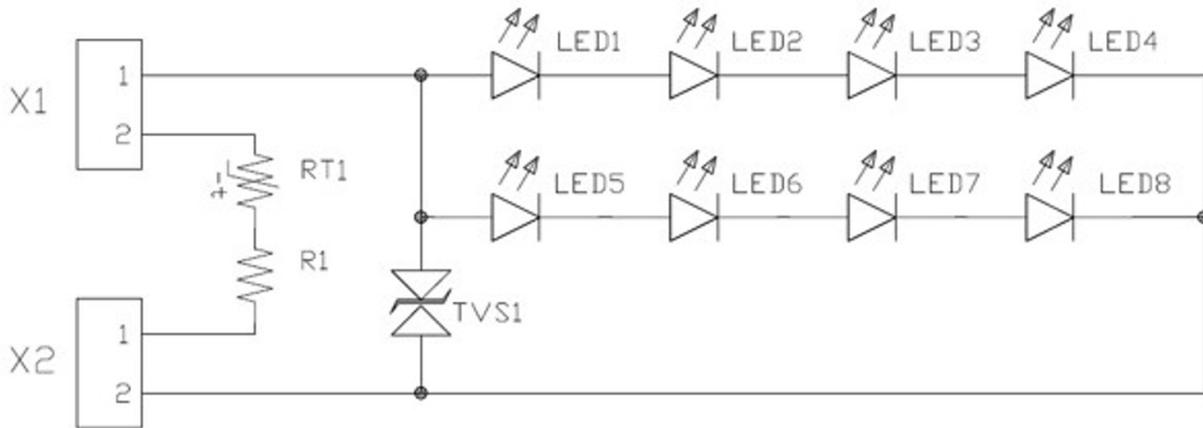


Figure 9. Electric circuit diagram for L225-xxxx008MLU010

- Notes for Figure 9:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

Table 7. Bill of Materials for L225-xxxx008MLU010

COMPONENT	QUANTITY
LED: LUXEON 5050 HE	8
PCB: MCPCB	1
2-pole Connectors	2
Diode	1
Resistor 2k $\Omega$	1
Thermistor 15k $\Omega$	1

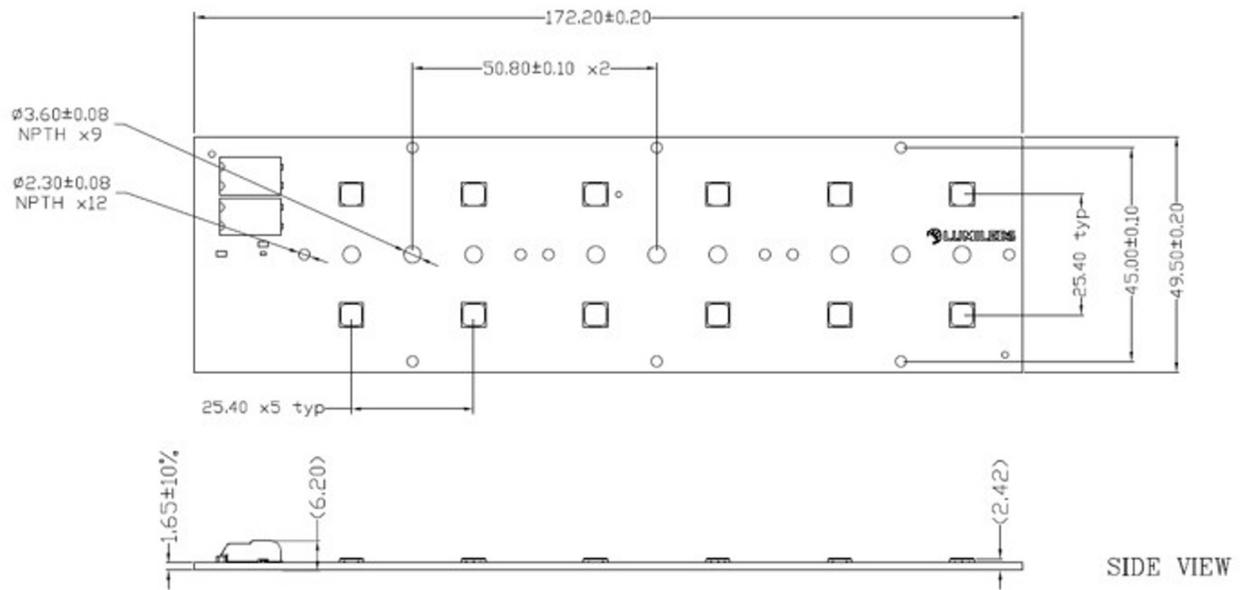


Figure 10. Mechanical dimensions for L225-xxxx012MLU010

- Notes for Figure 10:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

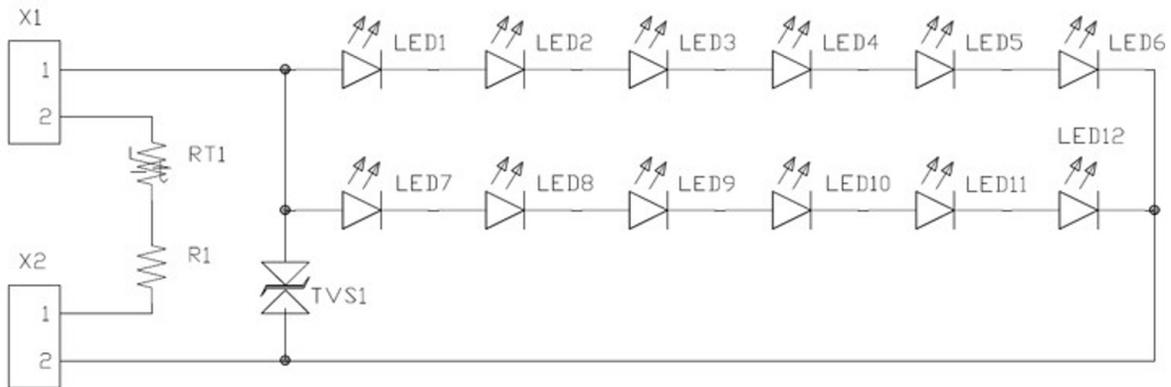


Figure 11. Electric circuit diagram for L225-xxxx012MLU010

- Notes for Figure 11:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

Table 8. Bill of Materials for L225-xxxx012MLU010

COMPONENT	QUANTITY
LED: LUXEON 5050 HE	12
PCB: MCPCB	1
2-pole Connectors	2
Diode	1
Resistor 2kΩ	1
Thermistor 15kΩ	1

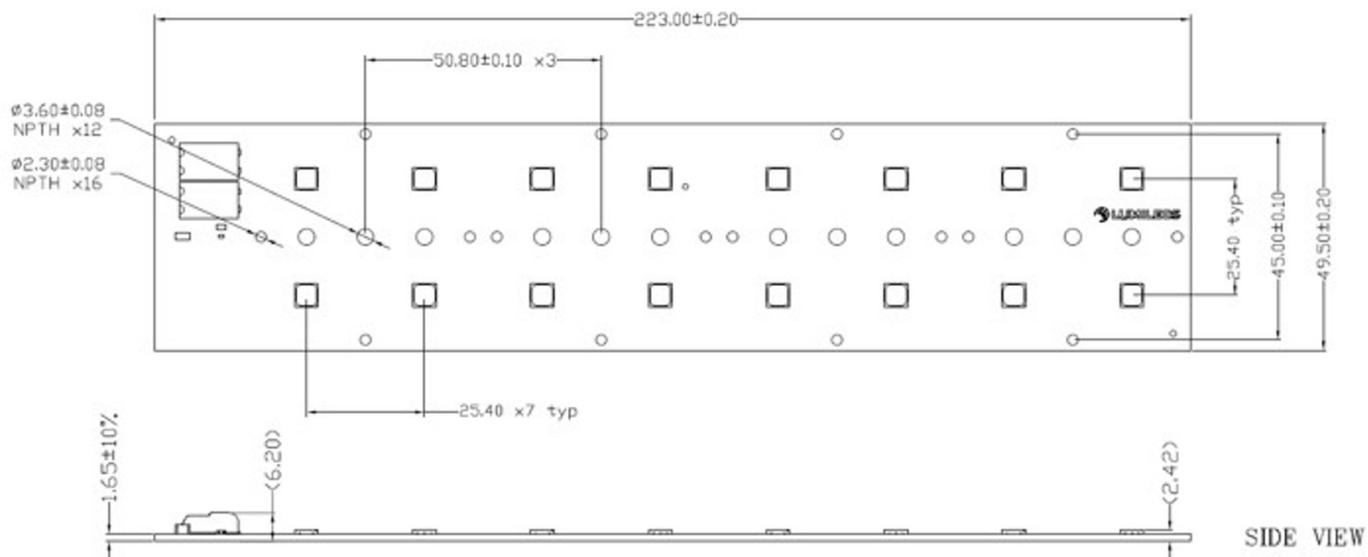


Figure 12. Mechanical dimensions for L225-xxxx016MLU010

- Notes for Figure 12:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

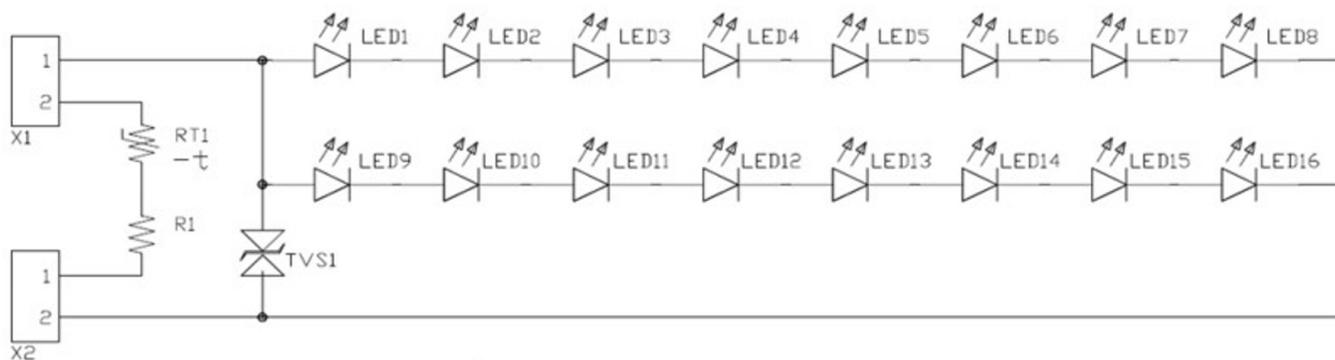


Figure 13. Electric circuit diagram for L225-xxxx016MLU010

- Notes for Figure 13:
1. Drawings are not to scale.
  2. All dimensions are in millimeters.

Table 9. Bill of Materials for L225-xxxx016MLU010

COMPONENT	QUANTITY
LED: LUXEON 5050 HE	16
PCB: MCPCB	1
2-pole Connectors	2
Diode	1
Resistor 2k $\Omega$	1
Thermistor 15k $\Omega$	1

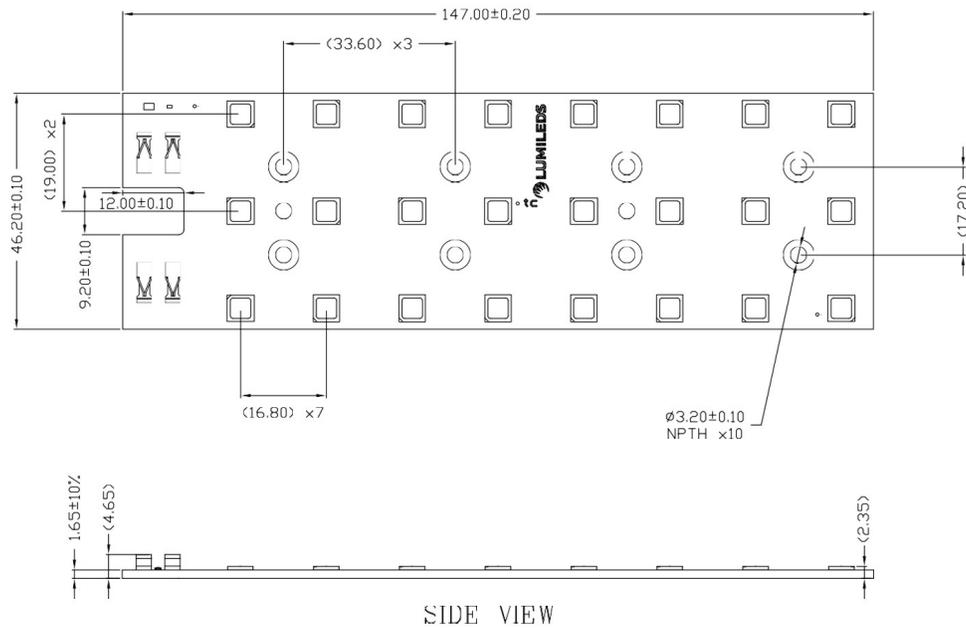


Figure 14. Mechanical dimensions for L225-xxxx024MLU010

Notes for Figure 14:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

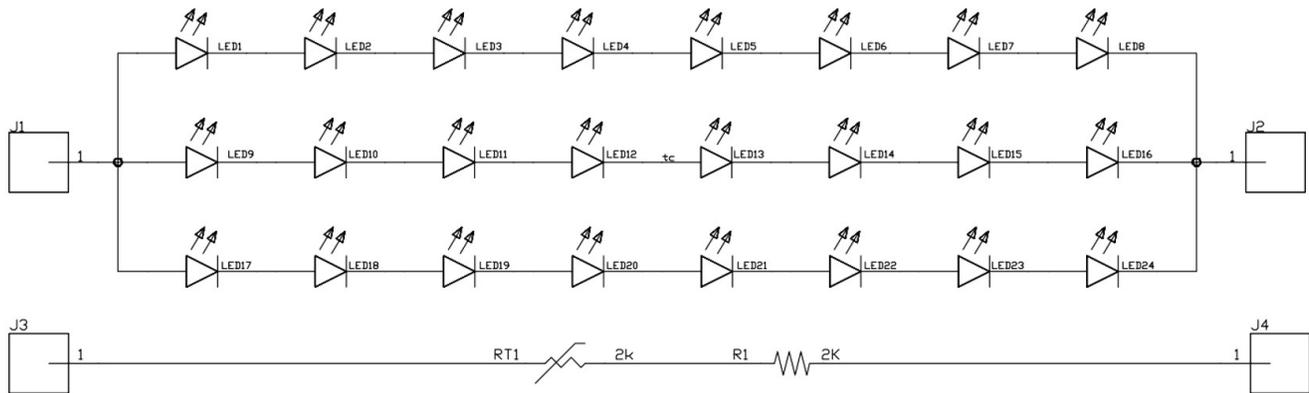


Figure 15. Electric circuit diagram for L225-xxxx024MLU010

Notes for Figure 15:

1. Drawings are not to scale.
2. All dimensions are in millimeters.

Table 10. Bill of Materials for L225-xxxx024MLU010

COMPONENT	QUANTITY
LED: LUXEON 5050 HE	24
PCB: MCPCB	1
1-pole Connector	4
NTC 15Kohm	1
Resistor 2Kohm	1

# Packaging Information

Table 11. Packing information for LUXEON XR-5050 HE

PART NUMBER	QUANTITY PER TRAY	TRAY QUANTITY PER BOX	STANDARD PACKING INCREMENT, SPI	SHIPPING BOX DIMENSION, L x W x H (mm)
L225-xxx008MLU010	20	4 full trays + 1 tray cover	80	390 x 382 x 100
L225-xxx012MLU010	20	4 full trays + 1 tray cover	80	390 x 382 x 100
L225-xxx016MLU010	20	4 full trays + 1 tray cover	80	587 x 387 x 100
L225-xxx024MLU010	20	4 full trays + 1 tray cover	80	390 x 382 x 100

# About Lumileds

Lumileds is a global leader in LED and microLED technology, innovation, and solutions for the automotive, display, illumination, mobile, and other markets where light sources are essential. Our approximately 3,500 employees operate in over 15 countries and partner with our customers to deliver never before possible solutions for lighting, safety, and well-being.

To learn more about our lighting solutions, visit [lumileds.com](https://lumileds.com).



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